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(54) Apparatus with remotely operable units

(57) An apparatus including a master unit (2) arranged to broadcast signals from an output to a plurality of local units (6) each responsive to receipt of an activation signal at a respective input, the master unit (2) including generating means for generating a modified activation signal to which the local units (6) are normally not responsive, and the local units (6) being operable so as to be individually responsive to receipt of the modified activation signal. When the master unit (2) is generating a modified activation signal selected local units (6) can be individually operated to test them while creating a disturbance near the local unit (6) being tested, only.

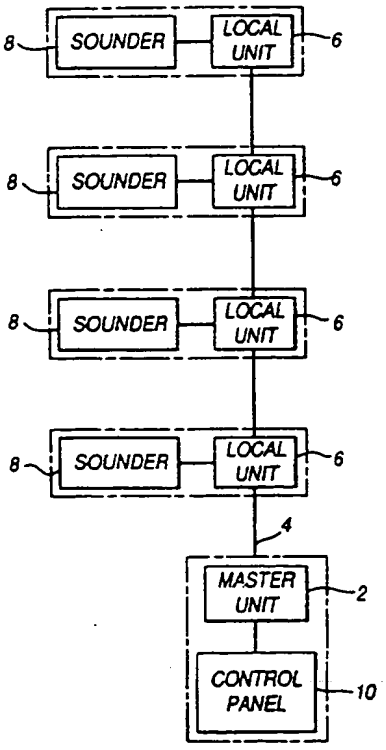

Fig. 1

GB 2 301 465 A

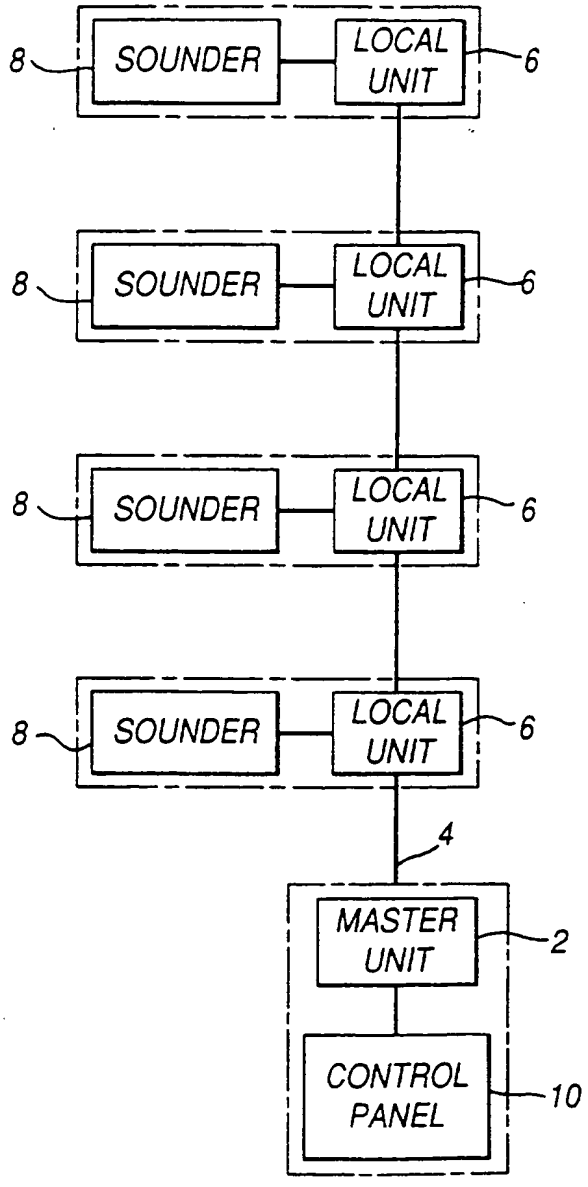
8
SOUNDER
LOCAL UNIT
6
8
SOUNDER
LOCAL UNIT
6
8
SOUNDER
LOCAL UNIT
6
8
SOUNDER
LOCAL UNIT
6
4
MASTER UNIT
2
CONTROL PANEL
10

Fig. 1

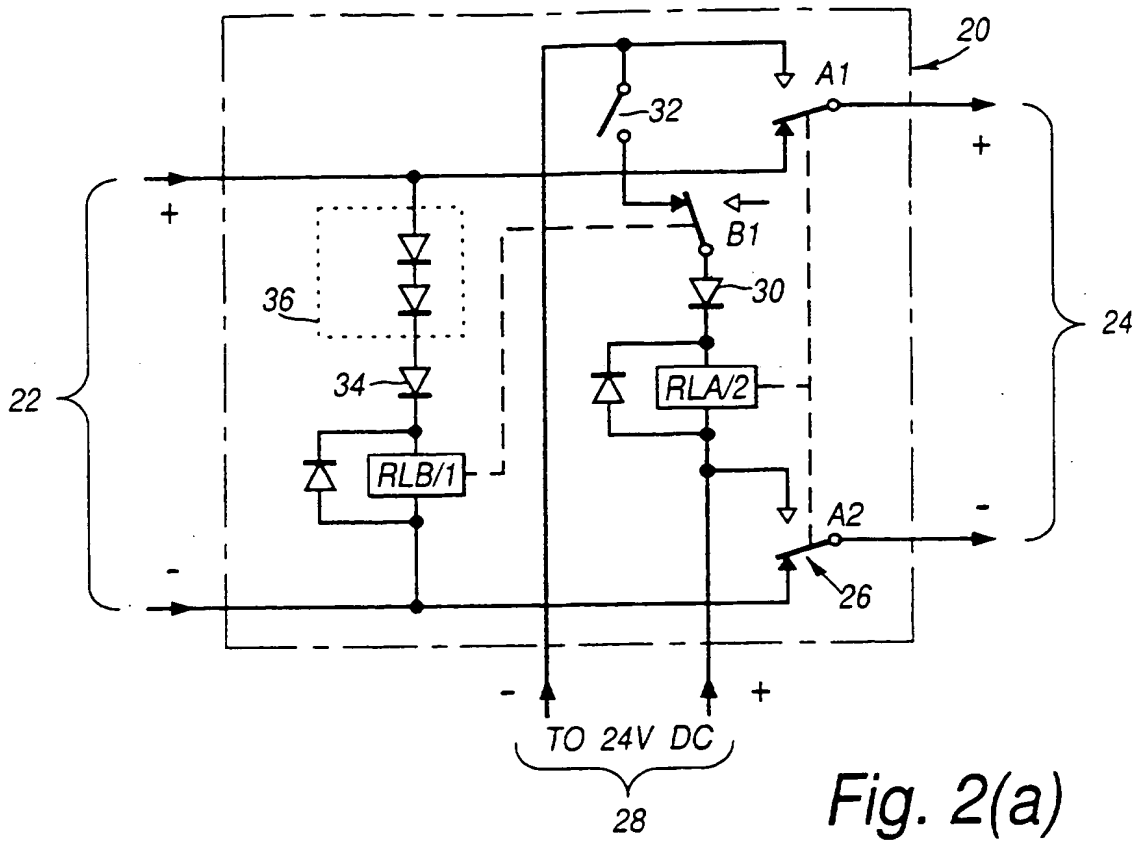
20
A1
32
+
B1
+
36
30
24
34
RLA/2
22
RLB/1
A2
-
-
26
-
+
TO 24V DC
28

Fig. 2(a)

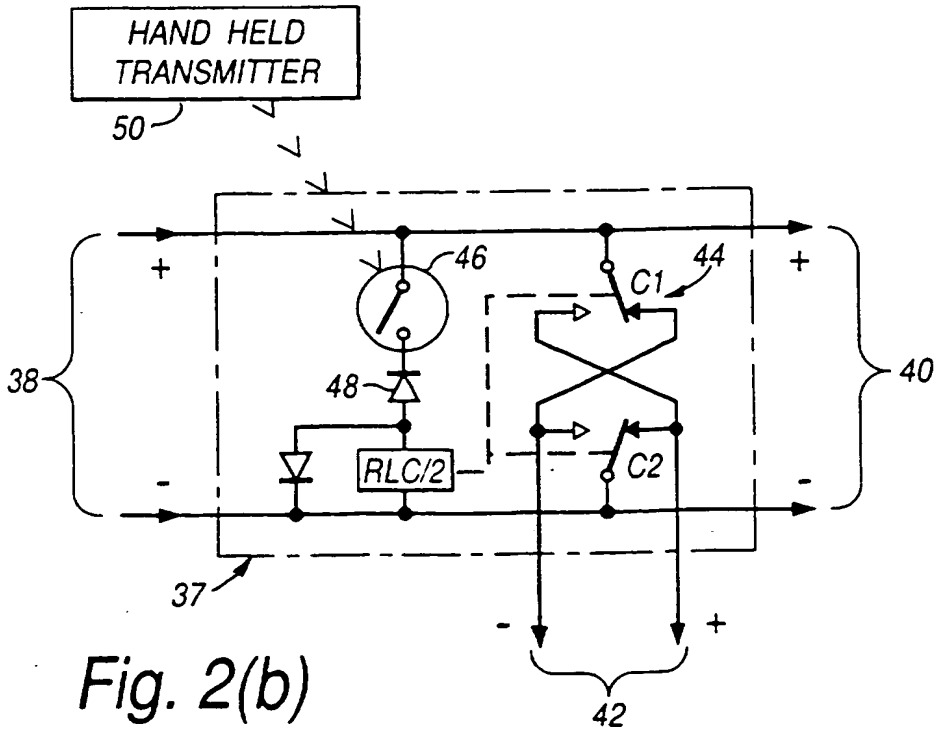
HAND HELD
TRANSMITTER
50
+
46
C1
44
+
38
40
48
RLC/2
C2
-
-
37
-
+
42

Fig. 2(b)

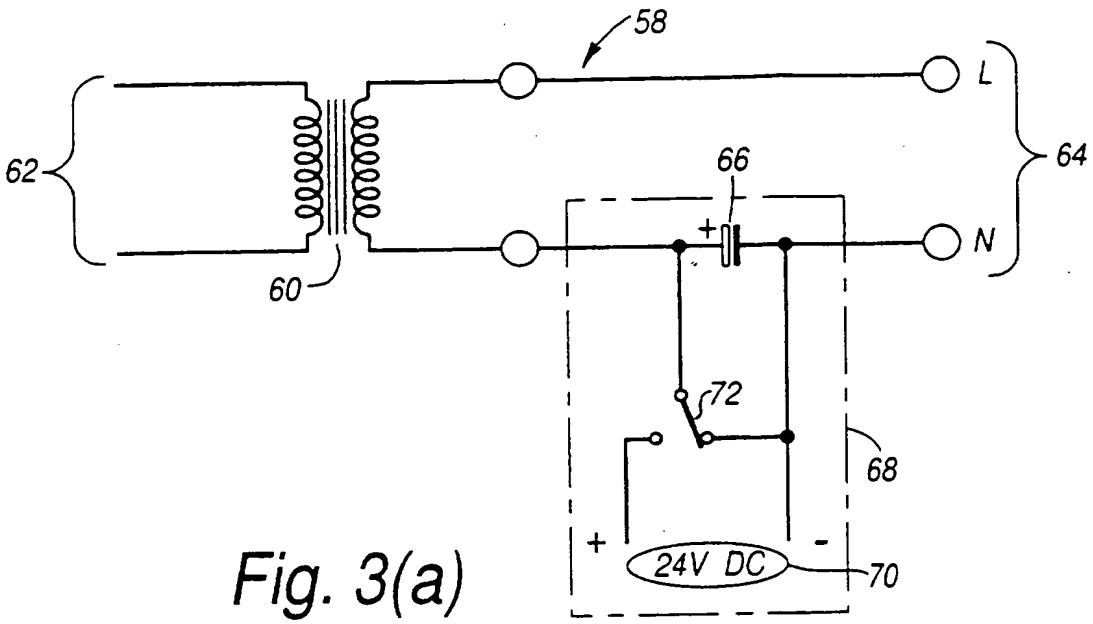
58
L
64
62
66
+
N
60
72
68
+
24V DC
-
70

Fig. 3(a)

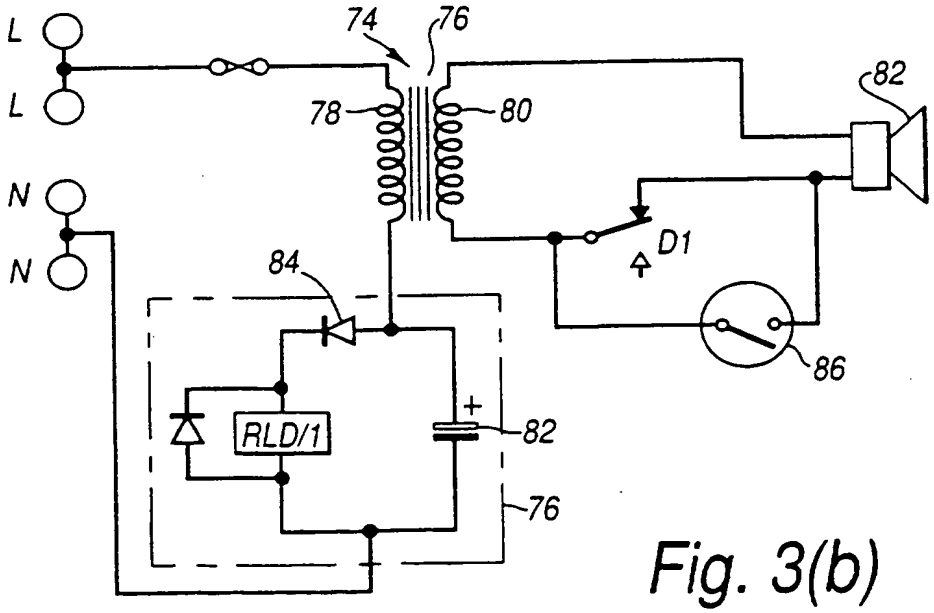
L
L
74
76
82
78
80
N
N
D1
84
86
RLD/1
+
82
76

Fig. 3(b)

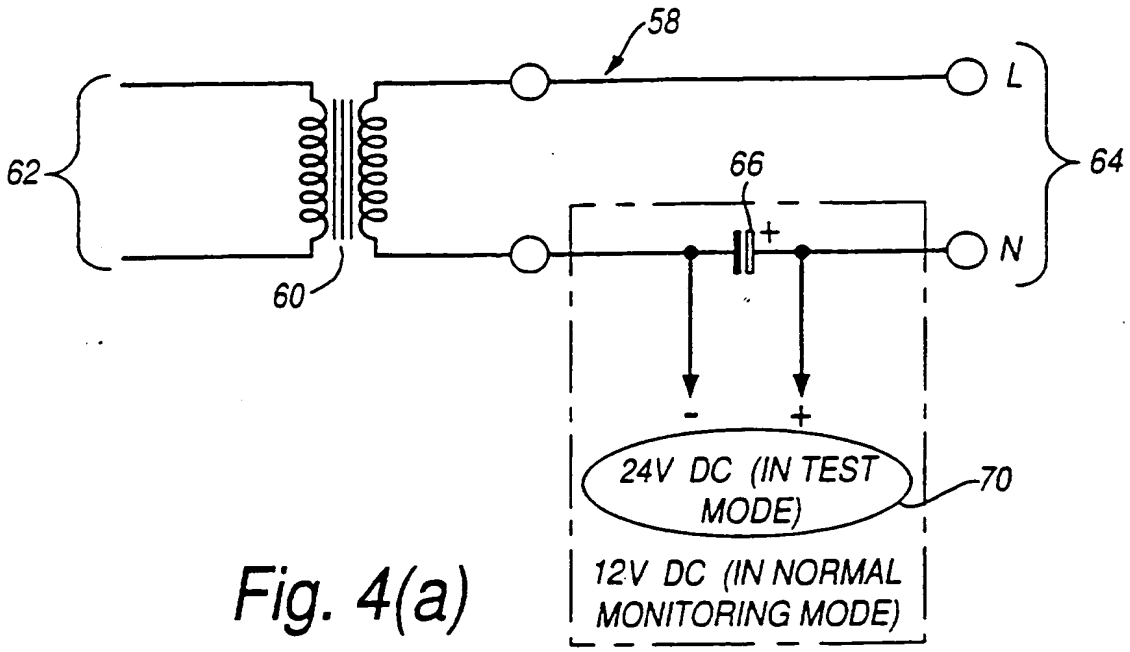
58
L
62
64
66
+
N
60
-
+
24V DC (IN TEST MODE)
70
12V DC (IN NORMAL MONITORING MODE)

Fig. 4(a)

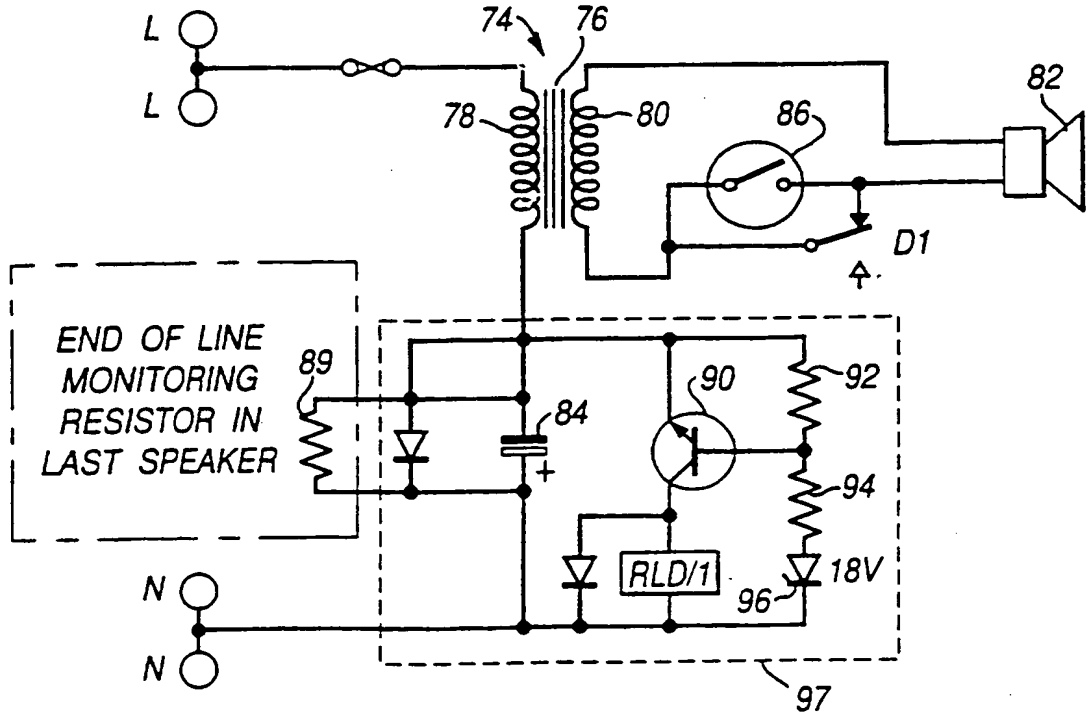
L
L
74
76
78
80
86
82
D1
END OF LINE MONITORING RESISTOR IN LAST SPEAKER
89
84
+
90
92
94
RLD/1
18V
96
N
N
97

Fig. 4(b)

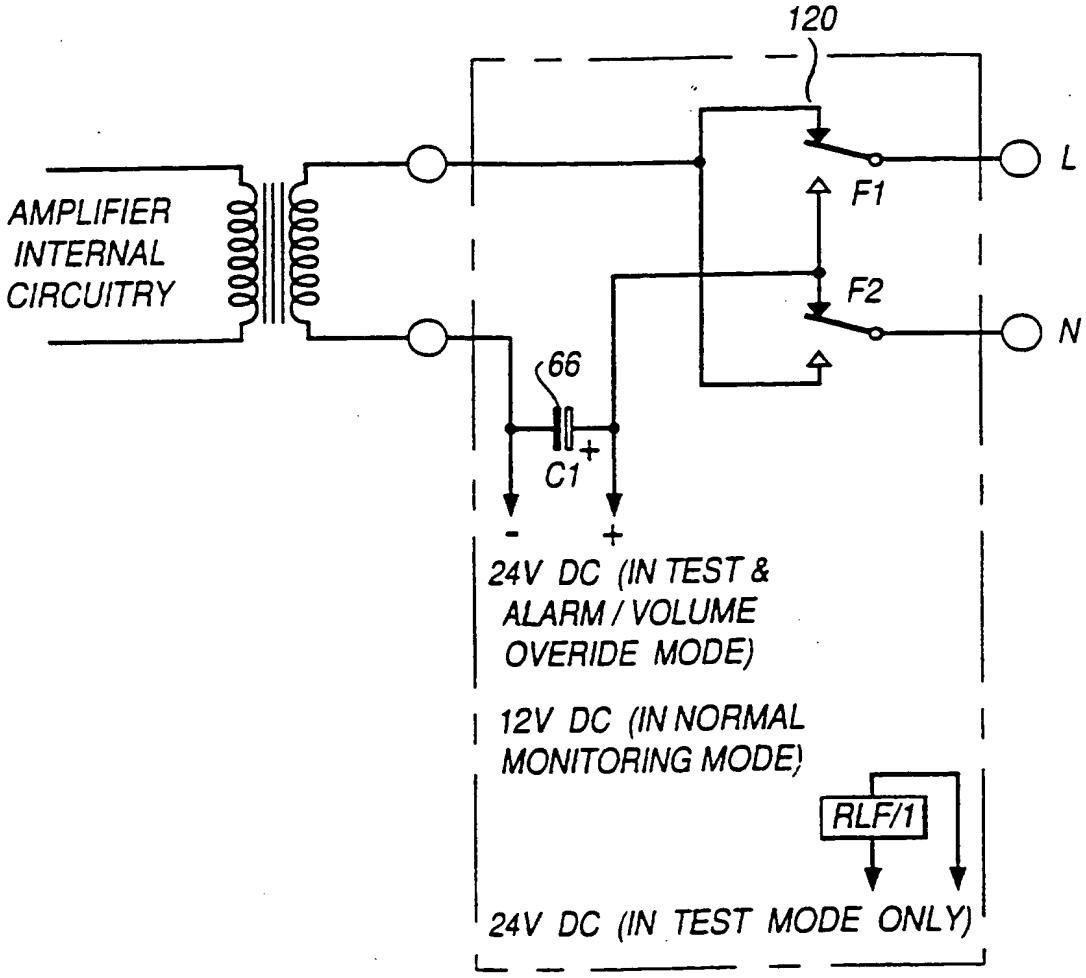
120
AMPLIFIER
INTERNAL
CIRCUITRY
L
F1
F2
N
66
C1
+
-
+
24V DC (IN TEST &
ALARM / VOLUME
OVERIDE MODE)
12V DC (IN NORMAL
MONITORING MODE)
RLF/1
24V DC (IN TEST MODE ONLY)

Fig. 5(a)

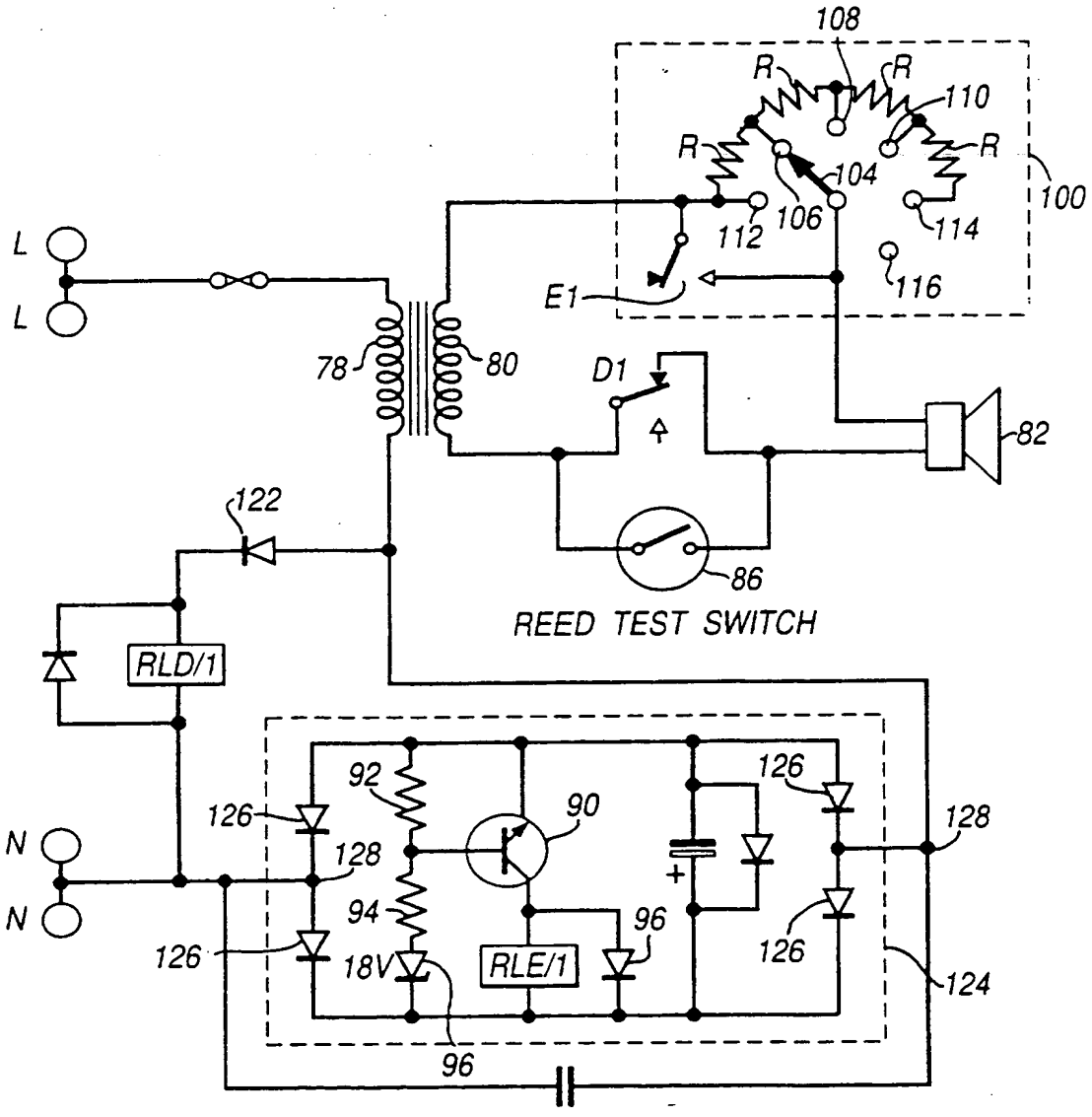
108
R
R
110
R
R
104
100
106
112
114
116
E1
L
L
78
80
D1
82
122
86
REED TEST SWITCH
RLD/1
92
126
90
126
128
128
N
N
94
96
126
18V
RLE/1
126
124
96

Fig. 5(b)

APPARATUS WITH REMOTELY OPERABLE UNITS

The present invention relates to apparatus including a master unit arranged to broadcast signals from an output to a plurality of local units each responsive to receipt of an activation signal at a respective input. Examples of such apparatus are alarm systems in which an alarm signal is generated by the master unit in the event of an emergency and broadcast to all the local units which on receipt of that signal activate the alarm at each local unit. The present invention is, however, also applicable to other such broadcast apparatus where the signal broadcast by the master unit is intended to instigate some test or other function at the local units simultaneously.

Examples of alarm systems include fire alarm sounders or public address loud speakers in hospitals, hotels, or other large public or private buildings where more than one local unit is required to provide a satisfactory coverage of an alarm throughout a building.

It is advisable that an alarm system, particularly, is tested at regular intervals to ensure that each of the alarms of the local units is properly activated when the master unit broadcasts the activation signal to them. One known way of carrying this out is to set the master unit to a test mode in which an activation signal is broadcast to the local units, to check the operation of the local units

to ensure they are operating correctly. This is a very unsatisfactory method of testing the alarm if the building is in continuous use because all the alarms are sounded while the checks are carried out. It is also often necessary to give an advance warning to the occupants that the alarm is a test alarm which can be ignored.

A consequence of the disruption caused by such testing in occupied buildings is that there is a tendency to postpone testing to the latest advisable time and in some cases to forego testing altogether.

The present invention seeks to provide an apparatus having master and local units which mitigate these disadvantages.

According to the present invention there is provided an apparatus including a master unit arranged to broadcast signals from an output to a plurality of local units each responsive to receipt of an activation signal at a respective input, the master unit including generating means for generating a modified activation signal to which the local units are normally not responsive, and the local units being operable so as to be individually responsive to receipt of the modified activation signal.

In the apparatus of the present invention, when the master unit is generating a modified activation signal none of the local units will be responsive to it to sound an alarm or carry out any other function normally associated

with receipt by the local unit of a non-modified activation signal. However, on operating an individual local unit so as to be responsive to receipt of that modified activation signal, that local unit alone will now respond. Thus, if the local unit is a sounder alarm, only that alarm will be sounded, the remainder of the alarms of the other local units remaining silent. An operator can therefore visit and test each local unit in turn so creating only a local disturbance in the vicinity of that local unit which he can warn people about immediately prior to testing it, if desired.

If the local units are spread over a large area, for example a large building, the operator can move from one local unit to the other between testing each local unit, without the need for all the alarm units to be sounding continuously for what might be an extended period of time while the operator completes the round.

The generating means of the master unit, which is arranged to be able to generate the modified activation signal, may be either designed into the master unit from its initial design or be a separate unit which can be retrofitted to an existing design of master unit. In each case the generating means should be switchable from a non-test state in which the usual operational signals generated by the master unit, such as fault monitoring signals, are broadcast to the local units in the normal manner, to a

test state where the modified activation signals are generated. The modified activation signals may be generated by converting activation signals generated by the master unit into modified activation signals, for example, or by generating them by another means.

Each local unit may include a conversion means for converting a received modified activation signal to a non-modified activation signal. In this arrangement of the invention the master unit can be set to generate a modified activation signal of a nature from which a non-modified signal can be recovered by the conversion means. In this way none of the local units will respond to the received modified activation signal unless operated such that the conversion means recovers a non-modified signal.

Each local unit may include an alarm sounder which sounds on receipt of an activation signal in the form of an electrical signal of a DC voltage of a predetermined polarity and the generating means arranged to generate a reversed polarity DC voltage as a modified activation signal. In this case the conversion means may be switchable to convert the received DC voltage of reversed polarity to a DC voltage of the predetermined polarity so causing only that local unit's sounder to sound.

In this case the conversion means can conveniently include a mechanical changeover switch switchable by a relay electrically connected in series with a rectifier and

a local unit test switch between a pair of input lines at which the DC voltage from the main unit is received. When the local unit test switch is closed the relay operates to switch the changeover switch to reverse the polarity of the received signal but only when the local unit is receiving the modified activation signal.

The rectifier ensures that current is able to flow through the relay only when the master unit is broadcasting a signal of reversed polarity and the local unit test switch is closed. The relay will then operate to reverse the polarity of the received DC voltage to activate the local alarm. If the main unit in the meantime transmits an alarm signal of the non-reversed polarity the relay will be de-energised by virtue of the rectifier thereby moving the changeover switch so that no reversal takes place. The received activation signal can therefore now sound the local alarm along with all the other local unit alarms which are properly activated by the activation signal from the main unit.

A convenient generating means for generating a reverse polarity DC voltage is one which includes a first pair of input lines for receiving activation signals generated by an alarm unit, a DC power supply and main unit switch means for connecting the first pair of input lines or the DC power supply to the output of the main unit.

The main unit switch means is preferably switchable by

a second relay connected in series with a rectifier and a main unit test switch across the DC power supply such that when the main unit test switch is closed the main unit switch means connects the DC power supply to the output of the main unit.

If the main unit is not in an alarm condition, i.e. not generating an activation signal, then closing the main unit test switch activates the relay to switch the DC power supply to the output of the main unit with a polarity which is reversed from that of the activation signal whereupon the local unit can be tested as described above, individually.

In a preferred embodiment a normally closed break switch is also connected in series with the second relay such that when the break switch is opened the main unit switch means connects the first pair of input lines to the main unit output. Opening of the break switch overrides the main unit test switch and restores the main unit to its normal condition in which an activation signal is broadcast without modification to the local units. For example, the break switch can be made switchable by a third relay in series with one or more rectifiers between the first pair of inputs such that if an activation signal is received at the first pair of inputs the third relay opens the break switch thereby de-energising the second relay thereby connecting the first pair of inputs to the main unit

output. This provides that should the main unit wish to activate the alarms of the local unit, the test mode is overridden and the activation signal is broadcast as required without modification so that all the local units will sound.

In another embodiment of the present invention each local unit includes a loudspeaker for broadcasting audio signals from the main unit. The local unit may include disconnection means which is arranged to disconnect the loudspeaker on receipt of a predetermined DC bias signal unless a normally open local unit test switch is closed. With this arrangement, the main unit can transmit the audio signal but all the local units will be inoperative because the DC bias has disconnected the loudspeaker at each unit. Each individual local unit can then be tested by individually overriding the effect of this DC bias signal. For example, the means for disconnecting the loudspeaker may be a break switch in the output coil of the loudspeaker transformer and including a relay electrically connected in series with a rectifier and the input coil of the loudspeaker transformer. The break switch is arranged to be opened by the relay on receipt of the predetermined DC bias voltage at the input. When the local unit test switch is closed the break switch in the output coil of the loudspeaker is bypassed thereby making the loudspeaker operative while the remaining local units are inoperative.

In this case a capacitor can be connected in parallel to the series connected rectifier and relay to allow the AC audio signal to the input coil of the loudspeaker transformer thereby allowing it to sound.

The main unit for use in conjunction with such a loudspeaker local unit may include means for selectively applying the predetermined DC bias signal across a pair of output lines to modify an activation signal.

The local unit may be arranged to be operable so as to be individually responsive to the receipt of a modified activation signal either by means of a manually operated switch or by a remotely operated switch, for example a reed switch switchable by a magnet or a switch means responsive to receipt of an ultrasonic or radio control signal. The switching action could be either momentary or latching to enable two or more sounders to be tested simultaneously if desired.

Embodiments of the present invention will now be described, by way of example only, with reference to the accompanying drawings of which:

Figure 1 is a schematic overview of an apparatus according to the present invention;

Figures 2(a) and 2(b) are circuit diagrams of a master unit and local unit, respectively, of an apparatus according to a first embodiment of the present invention;

Figures 3(a) and 3(b) are circuit diagrams of a master

unit, respectively, of a second embodiment invention;

) and 4(b) are circuit diagrams of a master it, respectively, of a third embodiment of ntion; and

a) and 5(b) are circuit diagrams of a master unit, respectively, of a fourth embodiment vention.

to Figure 1, a sounder alarm system e present invention has a master unit 2 d to broadcast signals from an output 4 to units 6, of which four are shown, each respective sounder 8. The master unit is trol panel 10. In normal operation if an sounded the master unit 2 will issue a on signal at the output 4 which will be the local units 6. They are responsive to activation signal to sound the sounders and required audible alarm. The master unit ting means for generating a modified which the local units are not normally al unit is operable so that it will be sive to receipt of a modified activation when the master unit is switched to test ce the modified activation signal, each of s can be operated in turn to individually

sound the sounder 8 associated with that local unit 6.

It will be appreciated that the apparatus of Figure 1 with sounder units is only one particular application of the present invention. The sounder may be replaced by another type of alarm or indeed some other apparatus which is responsive to a broadcast signal from the master unit but which it is desirable to test individually.

Referring now to Figure 2(a), a generating means 20 of a master unit is shown in which the activation signal is a DC voltage of a predetermined polarity. The generating means 20 has a pair of input lines 22 connected to an alarm unit (not shown) of the main unit which either generates an activation signal in the event of an alarm or is at some other voltage setting when no alarm has to be generated. The generating means 20 has a pair of output lines 24 which are, in the normal mode of operation, connected as shown to the input lines 22 via a ganged pair of switches 26 individually referenced as A1 and A2. The switches 26, when set as shown, connect the input lines 22 to the output lines 24 such that the polarity is preserved to leave the signal on input lines 22 unmodified. If the main unit activates a generating signal at lines 22, therefore, these will be transmitted via the output 24 to the local unit 6 which will then respond by activating the sounders 8.

The generating means 20 also includes a second pair of input lines 28 which are connected to a DC voltage source,

in this case 24 volts, which if connected to the local unit in the correct polarity constitutes an activation signal for activating the sounders 8 of the local units 6. The input lines 28 are electrically connected to the second poles of the switch 26 such that when switch 26 is moved to the switch position other than that shown, the DC voltage source is coupled to the output lines 24 with a polarity which is reversed from that of the activation signal.

The switch 26 is moved to the second position when a relay RLA/2 is energised but is biased to the position shown in Figure 2(a) so that it returns to this position when relay RLA/2 is de-energised. The relay RLA/2 is connected in series with a rectifier 30, a break switch B1 and a main unit test switch 32. The break switch B1 is in the position shown in Figure 2(a) in the absence of an activation signal being present on input lines 22. In such a circumstance when the main unit test switch 32 is closed the relay RLA/2 is energised which switches the switch 26 to output a reversed polarity DC voltage on the output lines 24. The apparatus is then in test mode and the local units can be individually tested as will be described with reference to Figure 2(b).

The generating means 20 further includes a second relay RLB/1 connected in series between a first rectifier 34 and a group of rectifiers 36. The rectifier 34 is such that if an activation signal is present on the input lines

22 the relay RLB/1 will be energised to move the break switch B1 to the right hand terminal as shown in Figure 2(a) which will disable the test mode by de-energising the relay RLA/2 and returning the direct connection between input lines 22 and output lines 24. The master unit will then broadcast the activation signal input at input lines 22. This arrangement therefore provides that an activation signal will be properly broadcast to all the local units in the event of a genuine alarm even though the main unit test switch 32 is closed.

In some control panels a small positive voltage is applied to the input lines 22 for broadcast to the local units 6 for fault monitoring. In this case it is necessary to include the diode group 36 in sufficient numbers to prevent RLB/1 being energised in the presence of this fault monitoring voltage or else the generating means might not be switched to the test mode on closing the main unit test switch 32, and the fault monitoring could be degraded.

Referring now to Figure 2(b) there is shown a conversion means 37 which is present in each local unit connected to the generating means shown in Figure 2(a). The conversion means 37 has a pair of input lines 38 for receiving the DC voltage from the output lines 24 of the generating means 20. The input lines 38 are coupled to the next local unit's input lines via lines 40 and to the alarm circuitry of the local unit via the conversion means 37

output lines 42 via a changeover switch 44 having elements C1 and C2. In non-test mode the switch 44 is biased to the position shown in Figure 2(b) in which the input lines 38 are connected to the output lines 42 such that an unmodified activation signal at the input lines is transmitted to the output lines 42 with the polarity which will cause the sounder of the local unit to sound.

The conversion means 37 includes a local unit test switch 46 which is biased to be normally open in series with a rectifier 48 and a relay RLC/2 between the input lines 38. When the local unit test switch 46 is closed the relay RLC/2 will be energised if there is a reverse polarity activation signal on input lines 38. The relay RLC/2 then operates to switch the switch 44 so that the polarity of the voltage on the output lines 42 is the reverse of that on the input lines 38.

In this case the reversed polarity voltage on the input lines is converted to the proper polarity necessary to sound the local sounder. Thus, if the generating means of the main unit is in test mode and supplying a reverse polarity signal to all the local units, each local unit can be tested by closing the local unit test switch 46 to sound only that unit's alarm.

If an activation signal is transmitted to the local unit when the switch 46 is open, then it will be transmitted through the conversion means 37 without

conversion as the switch 44 will be in a position shown in Figure 2(b). If when the activation signal is received on lines 38 the local unit test switch 46 has been closed, then because of the rectifier 48 the relay RLC/2 will be de-energised thereby putting the switch 44 back into the position shown in Figure 2(b). This means the receipt of a genuine activation signal overrides the test mode of the local unit which will then sound with all the other local units.

The local unit test switch 46 is, in this case, activated remotely by means of an ultrasonic hand-held transmitter 50 although other remote control methods or a manual switch could be employed instead.

Referring now to Figures 3(a) and 3(b) there are shown the master unit and local unit, respectively, of an apparatus which comprises a loudspeaker broadcast system.

Referring to Figure 3(a), a main unit 58 includes an output transformer 60 whose input coil is connected to an amplifier internal circuitry via input lines 62. The output coil of the output transformer 60 is electrically connected to output lines 64, one of them via a capacitor 66 which capacitor forms part of a generating means 68. The generating means 68 also includes a 24 volt DC bias source 70 and a switch 72. The terminals of the capacitor 66 can be either shorted or have applied to them the 24 volt DC bias signal dependent on the position of the main

unit test switch 72.

In the normal mode of operation the main unit test switch 72 is in the position shown in Figure 3(a) in which the capacitor 66 is shorted and any activation signals generated by the output amplifier 60 are transmitted to all the local units for reproduction by the loudspeakers. To go into the test mode, the switch 72 is moved to the second position to apply a 24 volt DC bias across the capacitor 66 which is superimposed on the activation signal generated by the output amplifier 60 on the output lines 64.

Referring now to Figure 3(b) there is shown a local unit 74 which includes a loudspeaker transformer 76 having an input coil 78 and an output coil 80. A break switch D1 is included in the output coil 80 connected to a loudspeaker 82.

The input coil 78 of the loudspeaker transformer 76 has in series with it a capacitor 82 and in parallel with the capacitor 82 a series circuit comprising a rectifier 84 and a relay RLD/1. A local unit test switch 86 is connected in parallel with the break switch D1. The local unit 74 is shown with the switch 86 in the normal operating arrangement in which an activation signal input to the input coil 74 will operate the loudspeaker 82.

If the main unit test switch 72 of the main unit 58 as shown in Figure 3(a) is moved to the test position, then the local units will receive a DC bias across the circuit

76 which will activate the relay RLD/1 to open the switch D1 and disable the local units, none of the local units will sound until a local unit test switch 86 is closed. In this case the test switch 86 will bypass the open switch D1 and reconnect the loudspeaker thereby allowing that local unit loudspeaker to operate whilst the others, with test switches 86 in an open position, remain silent.

It should be noted that the capacitor 66 of the main unit 58 should be of a low impedance compared to the total amplifier load over the frequency band to be used and capacitor 82 of the local unit 74 should be of a low impedance compared to a single speaker load over the frequency band to be used. Also, the transformer DC resistance of the master unit and local unit of Figures 3(a) and 3(b) should be low compared to that of the relay coil RLD/1 and the operating current of the relay coil must be sufficiently low not to cause magnetic saturation of the transformer core.

Referring to Figures 4(a) and 4(b), a variation of the embodiment of Figure 3(a) and 3(b) is shown namely a loudspeaker system in which the control panel applies a monitoring DC voltage to the loudspeakers 82 Common features are denoted by the same reference numerals.

In this embodiment, in normal operation, a 12V DC voltage is applied across capacitor 66 and a 24V DC voltage is applied in test mode as indicated in Figure 4(a). As

shown in Figure 4(b), the last speaker in the system has a monitoring resistor 89 across the capacitor 84 so a small monitoring current is drawn from the 12V DC supply during normal operation of the system. If a line between the master unit and the first speaker, or between any of the remaining speakers, is broken there will be an open circuit which is detected by noting the ceasation of the monitoring current.

In this embodiment, the relay RLD/1 will not operate due to the application of the 12V monitoring voltage developed over the terminals of the capacitor 84 by virtue of a transistor switch 90 whose base is electrically connected to the junction of resistors 92 and 94 in series with an 18V Zener diode 96. This circuit is indicated, collectively, by box 97.

When, however, the master unit is put into test mode by application of a 24V DC voltage across the capacitor 66 of the master unit, the voltage of the base of transistor 90 is increased sufficiently to turn the transistor 90 on whereupon relay RLD/1 operates to open switch D1. The remote unit can then be tested as described with reference to Figures 3(a) and 3(b).

Referring now to Figures 5(a) and 5(b), there is shown an application of the present invention to a loudspeaker alarm system in which the one or more loudspeakers include a volume control 100. In this example a series of

resistors, R, tapped by a switch 104, provides intermediate loudness settings 106, 108 and 110 between a full volume setting 112 and minimum audible volume setting 114. An off position 116 is also provided in which the loudspeaker is completely disconnected from the output loudspeaker coil 80.

In normal operation, a 12V DC monitoring voltage is applied across capacitor 66 as shown in Figure 5(a) which generates a monitor current as described in the embodiment of Figures 4(a) and 4(b).

Referring to Figure 5(b), with this polarity of applied signal, a diode 122 in series with a relay RLD/1 prevents relay RLD/1 from operating so maintaining switch D1 closed and the loudspeaker operational (subject to being switched off by switch 100).

When an alarm is sounded by generating an AC signal at the master unit, the setting of the switch 100 at each loudspeaker can be overridden to ensure an alarm is sounded at full volume by applying a 24V DC override voltage in place of the 12V DC monitoring voltage at the master unit of Figure 5(a). The 24V DC signal will also switch any line relays that might be fitted, so operating fire doors, for example.

Consider circuit 124 of Figure 5(b). Four rectifiers 126 form a rectifier bridge which provides that a voltage applied across terminals 128 of the rectifier bridge is

applied to a transistor switch circuit which is as circuit 97 of Figure 4(b) (and whose components have the same reference numerals). In this case, however, the transistor switch operates a relay RLE/1 which operates a loudspeaker volume control override switch E1.

When the normal 12V DC monitoring voltage is applied, the transistor 90 is switched off due to the action of the 18V Zener diode 96 and the switch E1 remains open allowing the loudspeaker volume control 100 to operate normally. If a 24V DC signal is applied, however, the transistor 90 switches on, as described with respect to Figure 4(b), causing relay RLE/1 to close switch E1 thereby overriding the loudspeaker volume control 100. The loudspeaker will therefore sound the alarm as required.

In this embodiment, the master unit of Figure 5(a) is put into test mode by applying a 24V DC signal across the capacitor 66 as well as to a relay switch RLF/1 which acts to operate the changeover switch 120 to reverse the polarity of the 24V DC signal output from the master unit.

The circuit 124 of Figure 5(b) operates as before to energise relay RLE/1 to override the loudspeaker volume controller 100 as previously described because of the polarity insensitivity provided by the rectifier bridge 126.

The reverse polarity 24V DC signal now applied to relay RLD/1 of Figure 5(b) is able to energise it so

opening switch D1 to disconnect the loudspeaker which can now be tested as described in relation to Figure 3(b), by closing the normally-open reed switch 86 so the associated loudspeaker 82 can emit the test tone generated by the master unit.

Each relay coil of the embodiments is connected in parallel with a diode to dissipate the magnetic energy stored in the core of a coil to prevent arcing at the relay contacts when the current to the coil is interrupted.

CLAIMS:

1. An apparatus including a master unit arranged to broadcast signals from an output to a plurality of local units each responsive to receipt of an activation signal at a respective input, the master unit including generating means for generating a modified activation signal to which the local units are normally not responsive, and the local units being operable so as to be individually responsive to receipt of the modified activation signal.

2. An apparatus as claimed in claim 1 in which each local unit includes conversion means for converting a received modified activation signal to an unmodified activation signal.

3. An apparatus as claimed in claim 2 in which each local unit includes an alarm sounder which sounds on receipt of an activation signal comprising an electrical signal of a DC voltage of a predetermined polarity, the generating means is arranged to generate a reversed polarity DC voltage as a modified activation signal, and the conversion means is switchable to convert the received DC voltage of reversed polarity to a DC voltage of the predetermined polarity.

4. An apparatus as claimed in claim 3 in which the conversion means comprises a local unit switch means switchable from a first setting in which the received modified activation signal is connected to the alarm sounder, and a second setting in which the modified activation signal is connected to the alarm sounder with a polarity reversal, thereby connecting the DC voltage of the predetermined polarity to the alarm sounder.

5. An apparatus as claimed in claim 4 in which the local unit switch means is switchable by a relay electrically connected in series with a rectifier and a local unit test switch between a pair of input lines at which the DC voltage from the main unit is received, such that when the local unit test switch is closed the relay operates to switch the switch means to the second setting only when the local unit is receiving the modified activation signal.

6. An apparatus as claimed in any one of claims 3 to 5 in which the generating means includes a first pair of input lines for receiving activation signals generated by an alarm unit, a DC power supply and main unit switch means for connecting the first pair of input lines or the DC power supply to the output of the main unit.

7. An apparatus as claimed in claim 6 in which the main unit switch means is switchable by a second relay connected in series with a rectifier and a main unit test switch across the DC power supply, such that when the main unit test switch is closed the main unit switch means connects the DC power supply to the output of the main unit.

8. An apparatus as claimed in claim 7 in which a normally closed break switch is also connected in series with the second relay, such that when the break switch is opened the main unit switch means connects the first pair of input lines to the main unit output.

9. An apparatus as claimed in claim 8 in which the break switch is switchable by a third relay in series with one or more rectifiers between the first pair of inputs, such that if an activation signal is received at the first pair of inputs the third relay opens the break switch, thereby de-energising the second relay, thereby connecting the first pair of inputs to the main unit output.

10. An apparatus as claimed in claim 1 in which each local unit includes a loudspeaker.

11. An apparatus as claimed in claim 10 in which the

loudspeaker includes disconnection means which is arranged to disconnect the loudspeaker on receipt of a predetermined DC bias signal, unless a normally open local unit test switch is closed.

12. An apparatus as claimed in claim 11 in which the means for disconnecting the loudspeaker is a break switch in the output coil of the loudspeaker transformer and including a first relay electrically connected in series with a rectifier. and the input coil of the loudspeaker transformer, the break switch being arranged to be opened by the first relay on receipt of the predetermined DC bias voltage at the input.

13. An apparatus as claimed in claim 12 in which there is a capacitor in parallel to the series connected rectifier, and the first relay.

14. An apparatus as claimed in any one of claims 9 to 13 in which the main unit includes means for selectively applying the predetermined DC bias signal across a pair of output lines to modify an activation signal.

15. An apparatus as claimed in any preceding claim in which the local unit is operable manually.

16. An apparatus as claimed in any one of claims 1 to 14 in which the local unit is operable remotely.

17. A generating means for use with an apparatus including a master unit arranged to broadcast signals from an output to a plurality of local units, each responsive to receipt of an activation signal at a respective input, the generating means being couplable to the output of the master unit and arranged to be operable to generate a modified activation signal for broadcast to the local units and to which the local units are normally not responsive, the modified activation signal being convertible to an unmodified activation signal.

18. A conversion means for use with an apparatus including a master unit arranged to broadcast signals from an output to a plurality of local units each responsive to receipt of an activation signal at a respective input, the conversion means being couplable to the input of a local unit and selectively operable to convert a received modified activation signal to an unmodified activation signal.

19. An apparatus substantially as hereinbefore described with reference to either Figure 1 or Figures 2(a) and 2(b) or Figures 3(a) and 3(b).

20. A generating means substantially as hereinbefore described with reference to either Figure 2(a), Figure 3(a), Figure 4(a) or Figure 5(a).

21. A conversion means substantially as hereinbefore described with reference to either Figure 2(b) or Figure 3(b), Figure 4(b) or Figure 5(b).

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Databases (see below)
(i) UK Patent Office collections of GB, EP, WO and US patent specifications.

(ii)

Documents considered relevant following a search in respect of Claims :-
1-16, 19

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Category	Identity of document and relevant passages		Relevant to claim(s)
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